

Powdery mildew resistant yellow summer squash cultivar evaluation, 2006.

The objective of this study was to evaluate five cultivars of straightneck yellow summer squash and one crookneck cultivar (Sunglo) with resistance to powdery mildew, plus two additional new cultivars (Conquerer III and XPT 1832 III), by comparing them to a susceptible cultivar that is an industry standard (Multiplik). A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead on Haven loam soil. All squash seed was planted on 7 Jun in the greenhouse and were transplanted into black plastic mulch on 19 Jun. During the season weeds were controlled with one application of Select 2 EC (8 fl oz/A) on 31 Jul, hand weeding, and mowing between the rows of black plastic mulch. Water was provided as needed through drip irrigation lines placed beneath the mulch. Additional fertilizer (N-P-K 34-0-0) at 29.4 lb/A was injected through the drip irrigation system on 12 and 28 Jul, 10 and 17 Aug. No fungicides were applied specifically for powdery mildew; however, copper fungicides applied for control of bacterial leaf spot (*Xanthomonas campestris* p.v. *cucurbitae*) would have also provided some suppression of powdery mildew on upper leaf surfaces. Champion WP (2 lb/A) was applied on 29 Jul; Cuprofix Disperss (2.5 lb/A) was applied on 12 Jul, and 5, 13, and 23 Aug; and Kocide 2000 (1.5 lb/A) was applied on 31 Aug. The following fungicides were applied preventively for downy mildew (*Pseudoperonospora cubensis*) and Phytophthora blight (*Phytophthora capsici*): Acrobat 50 WP (6.4 oz/A) on 12 Jul, Previcur Flex 6 F (1.2 pt/A) on 29 Jul, Ranman 400 SC (2.75 fl oz/A) on 23 Aug, and Tanos 50 WG (8 oz/A) on 31 Aug. Neither disease developed before the end of this experiment. Plots were one 20-ft row each with a plant spacing of 24-in. One zucchini plant of a susceptible cultivar (Zucchini Elite) was planted between each plot. A randomized complete block design with four replications was used. Upper and lower surfaces of leaves were assessed for powdery mildew beginning on 26 Jul, one day before fruit were harvested for the second time. Ten old and 10 mid-aged leaves were selected on 26 Jul and on 9 Aug in each plot based on leaf physiological appearance and position in the canopy. On 17 Aug, 10 mid-aged leaves were assessed. Powdery mildew colonies (spots) were counted; severity was assessed by visual estimation of percent leaf area affected when colonies could not be counted accurately because they had coalesced and/or were too numerous. Colony counts were converted to severity values using the conversion factor of 30 colonies/leaf = 1%. Average severity for the entire canopy was calculated from the individual leaf assessments. These canopy severity values were used to calculate area under disease progress curves (AUDPC) to obtain a measure of severity over the entire assessment period. A square root transformation was used when needed prior to analysis to achieve homogeneity of variance. Squash fruit were harvested and weighed a total of eight times on 24 and 27 Jul; and on 4, 7, 11, 14, 18, and 24 Aug. Fruit were separated into marketable and unmarketable grades based on length and blemishes from disease (bacterial leaf spot) and insect feeding. Weight and length of marketable fruit were measured.

All cultivars tested exhibited control of powdery mildew on lower leaf surfaces, where symptoms were most severe, relative to Multiplik based on AUDPC values. Conquerer III (26% control) and XPT 1832 III (17% control) are not marketed as having resistance and thus were not expected to be less severely affected by powdery mildew than Multiplik. Both were significantly more severely affected by powdery mildew on both leaf surfaces than the six resistant cultivars, which provided a very high degree of suppression (84-99%). Conquerer III and Patriot II have transgenic resistance to two viruses: WMV and ZYMV. Conquerer III also is resistant to CMV and PRSV. General Patton and Sunray have the precocious yellow gene, as does the susceptible standard cultivar Multiplik, which masks fruit symptoms of virus infection by WMV and CMV. General Patton produced the greatest number and weight of marketable fruit. Success PM had the lowest yield. Fruit production was affected by poor weed control; therefore, yield data should not be considered an indication of yielding ability but rather should be considered relative yield values.

Cultivar	Powdery mildew severity (%)*						Yield data		
	Upper leaf surface			Lower leaf surface			Marketable Fruit/Plant		Fruit weight (lb)
	26-Jul	9-Aug	AUDPC	26-Jul	9-Aug	AUDPC	Total number	Yield (lb)	
General Patton	0.0 c**	0.0 c	0 c	0.0 b	0.0 d	5 c	4.1 a	1.4 a	0.50
HMX 5712.....	0.0 c	0.0 c	0 c	0.0 b	0.0 d	8 c	2.1 cd	0.9 cd	0.47
Sunray.....									
...	0.0 c	0.0 c	0 c	0.0 b	0.0 d	6 c	3.6 ab	1.3 a	0.49
Sunglo.....	0.0 c	0.0 c	5 c	0.0 b	0.8 cd	22 c	3.9 ab	1.3 ab	0.43
Patriot II.....	0.2 c	0.6 bc	27 c	0.4 b	4.9 b	77 c	2.9 abc	1.2 abc	0.54
Success PM.....	0.2 c	0.4 bc	26 c	1.7 b	2.3 bc	78 c	1.4 d	0.9 d	0.74
Conquerer III....	7.1 a	5.3 a	185 ab	15.4 a	24.3 a	368 b	2.1 cd	0.8 d	0.38
XPT 1832 III....	3.5 b	1.8 b	141 b	12.7 a	30.8 a	413 b	3.3 abc	1.2 abc	0.40
Multiplik (std.)...	4.1 b	7.7 a	219 a	17.9 a	36.0 a	499 a	2.6 bcd	1.0 bcd	0.47
P-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0078	0.0023	0.2786

* Exact colony counts were made when possible and severity was estimated using the conversion factor of 30 colonies/leaf = 1%.

Severity data is for old leaves on 26 Jul and on mid-aged leaves on 9 Aug.

** Numbers in each column with a letter in common are not significantly different according to Fisher's Protected LSD (P = 0.05).